

mathematicians, to say nothing of the educated general public! His task is only comparable with the historic one which Mrs. Partington set herself with respect to the Atlantic.

Bangor, June 7.

A. GRAY.

Larvæ from the Head of an Antelope.

IN preserving the head of an old ♂ Hartebeeste (*A. cokei*), shot on March 31, I took from the nostrils a few hours after death some twenty large larvæ, which I am now forwarding you for identification.

On April 19 I found similar larvæ in the nostrils of an old ♀ Wildebeeste (*C. taurina*); but I think their occurrence in the heads of antelopes in this part of Africa must be comparatively rare; as, though I have shot and preserved the heads of quite a number—including many Hartebeeste—I have not come across them in any other instance. I may add, no appreciable emaciation was shown by the animals from whose heads the larvæ were taken.

RICHARD CRAWSHAY.

Kiu, Uganda Railway, British East Africa, April 29.

THESE larvæ are those of a fly of the family Oestridæ, and their structure, as well as their habits, shows them to be referable to the genus *Oestrus*, and to be allied to the well-known "Sheep-bot fly," or "Sheep-nostril fly" (*Oestrus ovis*).

Brauer in his "Monographie der Oestriden" (Vienna, 1863) mentions such larvæ as having been found in three species of antelope, and describes two species of fly (*O. variolosus*, Löw., and *O. clarkii*, Shuck.) from South Africa, both probably parasitic on antelopes.

Probably a search through the scattered literature since Brauer wrote would bring to light the record of other species of *Oestrus* with similar habits; but, unless the flies were bred from the larvæ, which would not be very difficult, the species concerned could not be identified.

WALTER F. H. BLANDFORD.

48 Wimpole Street, London, June 8.

Walrus.

FERDINANDO VERBESTI (1630-1688), in his work in Chinese, "Kwan-yu-wai-ki" (Brit. Mus. copy, 15,297 a, 6, fol. 10, a), sub. "Marine Animals," relates thus: "The *Loh-sze-ma* is about 40 feet long, with short legs, and staying at the bottom of sea comes to the surface very seldom. Its skin is so hard that even swords are unable to pierce it. It has on its forehead horns resembling hooks, with which it hangs itself on a rock, thus sleeping a whole day without slightest awaking." With all deference to Prof. G. Schlegel, who takes the animal here described for the Narwhal (*Toung Pao*, October 1894, p. 370), I will bolden myself for truth's sake to state that the walrus is meant herein, *Loh-sze-ma* being only a Chinese rendering of *Rosmar*, the Norwegian name of the walrus. The main parts of this description agree well with the description given by Olaus Magnus ("Historia de Gentibus Septentrionalibus," Rome, 1555, p. 757), but not exactly—e.g., the latter author indicates the size of the animal by the words, "maximos ac grandis pisces elephantis magnitudine"; while the former gives it more precisely, though much more exaggerated.¹ Can you or any of your readers oblige me by telling from what very source Verbesti derived his description?

Magnus speaks of the sleeping of the walrus hanging itself on rock with its tusks to be often so sound as to expose its life to danger. Similar story is told in Japan of the sun-fish (*Orthogoriscus mola*), which is said to be floating asleep while its flesh and entrail are being removed (Kaibara, "Yamato Honzō," 1708, book xiii., fol. 43 b).

KUMAGUSU MINAKATA.

7 Effie Road, Walham Green, S.W., June 5.

Strawberry Cure for Gout.

IN connection with the letter of "F. G." in NATURE of June 8 (p. 125), on the strawberry cure of gout, I may mention that last year, when strawberries were so plentiful in England, a lady residing in Kent, who had formerly spent several years in Ceylon, where she had suffered from the wasting and often fatal complaint known as "Ceylon sore mouth" (the chief symptom of which is ulceration of the mucous membrane of the digestive

¹ Gesner says: "Alium esse puto qui *Rusvaal* nominatur, quinquaginta passuum longitudine. . . ." ("Historia Animalum," lib. IV., sub. "De Rosmaro").

organs), having had a return of the malady, and being unwilling to go abroad to undergo the "grape cure," conceived the happy idea to try strawberries instead, confining her diet to several pounds of these a day with plenty of milk. The remedy was so effectual that after a few weeks she was entirely cured of her malady, and had grown stout and well again.

5 Bedford Place, Croydon.

DONALD FERGUSON.

THE FRESH-WATER PEARLS OF AMERICA.

THE production of pearls by numerous species belonging to the fresh-water bivalve family *Unionidae* has been a matter of common knowledge from time immemorial. Such pearl-bearing mussels occur in the Tay, Isla, and several others of the rivers of the British islands, as well as in many of those of the continent, Mesopotamia, China, and North and South America. As a rule, however, such fresh-water pearls, in Europe at least, are inferior in lustre, and consequently in value, to those obtained from the pearl-oyster; and in those British rivers which produce the pearl-bearing species of *Unio*, it is stated that on the average one pearl is found in every hundred shells, and that only one pearl out of a hundred is fairly clear. During the eighteenth century, however, a considerable number of Irish pearls, ranging in value between 4*l.* and 10*l.*, were obtained, while one specimen, when mounted, realised 80*l.* In Scotland, pearls worth from 3*l.* to 4*l.* each are not unfrequently found, and it is stated that as much as 100*l.* has been paid for an unusually fine example. According to Dr. P. L. Simmonds, between the years 1761 and 1764 ten thousand pounds' worth of Scotch pearls were sent to London, while in the corresponding decade of the present century the amount was considerably more than double that value. During the dry season of 1862, when the lowness of the streams rendered the fishing unusually favourable, more pearls were collected than in any previous year; and the average price consequently fell to fifty shillings, or less. Twenty years ago, when from 5*l.* to 20*l.* was obtained for fine specimens, the general price was, however, much higher; and one Scotch pearl, for which forty guineas was given, is the property of the Queen.

British pearls were well known to the Romans, and it is probable that those from continental rivers were in demand at an equally early date. With the opening-up of the American continent by the Spanish explorers, the world was, however, flooded with a totally new supply of pearls, which there is good reason to believe were also of fresh-water origin. Wonderful are the accounts of the pearls found in the possession of the natives during the De Sota expedition from Florida to the Mississippi in 1540; and three centuries later Messrs. Squier and Davis disinterred vast quantities of damaged pearls from the ancient mounds of Ohio. So great was the number of pearls brought to light by these and other explorers, that it was considered improbable they could have been the products of the fresh-water unios of the country, and they were consequently believed to have been obtained from the pearl-oysters of the Pacific. In later years, however, many naturalists of repute were inclined to doubt the truth of this suggestion; and in an important and interesting memoir on the "Fresh-Water Pearls and Pearl-Fisheries of the United States," recently issued by the U.S. Fishery Commission, the author, Mr. G. F. Kunz, sums up the question as follows: "Notwithstanding the intercourse existing between remote Indian tribes, as shown by many authorities, and the fact that Pacific coast shells have been carried to Arizona, and that clam-shells have been found in Zuñi cities by Lieut. Cushing, it is likely that these pearls came, not from the pearl-oysters of the Pacific coast, but from the marine shells of the Atlantic coast and the fresh-water shells of the eastern part of the continent. It is very probable that the Indians opened the shells to secure the animal as an article of food; that the shells of some

varieties, such as the common clam and conch, were made into wampum; and that the pearls found in the shells were used as ornaments, whether lustreless pearls from the common oyster, or lustrous ones from the *Unio*."

The opinion that these old pearls are of fresh-water origin is based on the fact that many of the North American rivers and lakes still abound with pearl-yielding *Unionidae*; and it is, therefore, the more remarkable that for over two centuries from the date of the Spanish exploration nothing seems to have been ascertained about the latter. As Mr. Kunz says, "the natives have been dispersed, and the white race, occupied with other interests and necessities, took little note of the hosts of fresh-water shells inhabiting the streams and lakes, and did not suspect their power of producing pearls. In the year 1749, John Winthrop, in a natural history catalogue, first mentioned the production of pearls by the fresh-water mussels of the country. But more than a century was destined to elapse before any practical result arose from this knowledge; for it was not till 1857, when the "queen-pearl" was discovered at Notch Brook, near Paterson, New Jersey, that the country awoke to a conception of its hidden treasures. This pearl, which weighed 93 grains, was sold to the Empress Eugénie of France for 500*l.*, and is said at the present day to be worth four times that sum.

Its discovery immediately gave rise to an outbreak of "pearl-fever"; and the mussels of Notch Brook and other rivers were gathered by the million and ruthlessly destroyed, frequently with no pecuniary profit. So careless indeed was the mode of operation that a pearl weighing 400 grains, which would probably have proved the record specimen of modern times, was ruined by boiling the mussel in which it was contained. During the first year of the fever, the value of the pearls sent to New York was fully 3000*l.*; in 1858 it fell to about 400*l.*, while from 1860-63 the yield was only 300*l.* for the whole period. Although there was some slight revival of the trade in 1868, when pearls were discovered in the Little Miami river, Ohio, it was not till 1876 that any important find was made. But in that year 600*l.* worth were obtained from Waynesville, Ohio, a locality which has since yielded many more pearls, among them one of 38 grains weight, although of somewhat irregular shape. Since 1880 pearls have been found in districts further to the south and west; Kentucky, Tennessee, and Texas becoming the chief pearl-producing States, while Florida has also contributed its quota. New Brunswick and Canada likewise entered into the competition, while in 1889 Wisconsin appeared on the scene with a large consignment of magnificently coloured pearls. Within three months more than 2000*l.* worth of these latter reached New York, including one specimen valued at over 100*l.*, the principal colours being purplish-red, copper-red, and deep pink. These finds led to intense activity among the pearl-hunters, with the result that the mussels were nearly exterminated in that district. Other parts of Wisconsin were found, however, to be equally prolific, and since 1889 it is estimated that pearls to the value of at least 5000*l.* have been obtained from that State alone. From exhaustion of the mussel-beds, the pearl excitement in the North-west subsided in the course of a few seasons.

In 1897, the "fever" burst out anew in Arkansas, where it extended west into Indian territory, and north into Missouri, Georgia and certain districts in Tennessee being likewise affected. This period of excitement and activity promised to extend into 1898, of which year no accounts are at present to hand. A remarkable feature about the Arkansas discovery was the fact that a large proportion of the best pearls were obtained lying loose on the mud of the shores, or at the bottom of shallow waters, while sometimes they were found in or upon the soil at some distance from the water. "This peculiar oc-

currence," writes Mr. Kunz, "is partly explained by the wide extension of the waters in flood times over the low regions of the State, and by the shifting of streams and isolation of 'cut-offs'; but the facts indicate further that under some circumstances, probably by agitation of floods and freshets, the loose pearls are lost or shaken out by the unios. A local impression prevails that the mussels 'shed' them at certain seasons. The fact that the pearls thus found were generally round and well-formed; the aggregation in repeated instances of several or many near or together, and the non-occurrence of shells with them at these places—all point to the washing out of loose pearls from the unios, and their distribution by floods and freshets."

In 1897, the excitement appears to have had somewhat disastrous results in certain districts by abstracting the washers from their regular fields of labour. It has also caused a revival of pearl-hunting in other districts, notably in the neighbourhood of New York. Florida may at present be regarded as an almost unworked country; but, judging from the specimens hitherto obtained, will probably yield a rich harvest. The two largest and finest pearls at present collected from this State weigh respectively 68 and 58 grains, and realised 170*l.* and 120*l.*

Connecticut has also witnessed a revival of pearl-hunting; and here one of the collectors has started the German plan of using a pair of pincers to prise open the valves of the shells.

The mussels that yield pearls in the States all belong to the typical genus *Unio*, and include at least sixteen species. Most pearls appear to be obtained from the common *U. complanatus*, which is a very thick and rounded shell, shaped not unlike a *Cyprina*. Pearls are, however, occasionally found in thin and elongated species, like *U. rectus*. In the Amazon basin of South America, the pearl-bearing species belong to the allied genera *Hyria* and *Castalia*, while in China the profitable species is a *Dipsas*, and is much like the ordinary British *Anodonta* in general form. *Unio (Margaritana) margaritifera* is the British pearl-mussel.

With regard to the occurrence of the Arkansas pearls on the mud, it may be explained that the *Unionidae* generally dwell in America on clear gravelly bottoms, and that in such situations the pearls when extruded from the shell would be ground up by the pebbles, or would be indistinguishable among them. Not so on the mud of the Arkansas streams, which seems to be the haunt of the unios. Whether the supposition above mentioned, that the pearls are washed out or shed from the shells during life, be well founded, requires further investigation. It is stated that their non-association with shells is due to their having been washed away by floods or freshets after expulsion from the living animal; but this explanation would apply with equal force to the pearls yielded by defunct mussels.

With a view of regulating the industry and preventing, if possible, the reckless destruction of mussels that takes place at each outbreak of the "fever," the U.S. Fish Commission commenced in 1894 an inquiry relating to pearl-fishing in the States; and the result of its labours up to 1898 is embodied in the report quoted above, the general conclusions being summed up as follows:—"The shells are most abundant in swift and clear waters, where the bottom is sandy or gravelly, and the country-rock calcareous. While still numerous in many streams, they have greatly diminished within a few years past, wherever the pearl-hunting enterprise has extended, and at some points are nearly exterminated. The pearls found are few, and those of marketable value represent the destruction of thousands of shells for every pearl obtained. . . . The methods of gathering the shells and extracting the pearls are the simplest and the most primitive, and the activity of a few

seasons generally exhausts the beds. This state of affairs is one that loudly calls for reform. The wealth of unios that fills our rivers and streams is rapidly being destroyed by ignorant and wasteful methods of pearl-hunting; and either some form of protection is important, or, if that be not possible, a wide diffusion of information as to better methods, and particularly the introduction of the tools used in Germany for opening unios far enough to see if there are pearls contained, without destroying the animal, which may then be returned to the water."

In the clearer streams of the country, the best method of collecting the mussels is by wading into the water armed with a water-telescope and a pair of spring nippers affixed to the end of a stick. The water-telescope consists of a long, light, quadrangular tube open above, and shaped to fit the face (to which it is strapped), and closed below with a glass plate. Dressed in waterproof clothing, the pearl-hunter wades along the bed of the stream in a stooping posture, with the lower end of the tube immersed in the water, by which he is enabled to see the mussels on the bottom, and so to pick them out one by one with his nippers. Fresh-water pearls in general are remarkable for their variety of tints, and nowhere is

THE GEOLOGY OF MONT BLANC.¹

MONT BLANC and its aiguilles present some difficult problems to both petrologists and physical geologists; problems, which, though they have something in common, are to a great extent distinct. The authors, however, have grappled with both. Their monograph, as a study of the petrography of the region, is full of valuable information; but we think they have not been quite so successful in dealing with what it is now the fashion to call the tectonics. This portion no doubt contains much that is valuable, but the physical structure of the *massif* of Mont Blanc has been treated too much as if the latter were isolated instead of being, as is really the case, inseparable from the western and central part, perhaps even from the whole, of the Alpine chain.

As most people are aware, the crystalline *massif* of Mont Blanc is defined by two well-marked troughs, occupied by rocks of secondary age, the more northern being furrowed by the valley of Chamonix, the more southern by that of Courmayeur. Each is bounded on the further side from Mont Blanc by crystalline rock, the former by the well-defined range of the Brevent and



FIG. 1.—Contact of protogine with crystalline schists below the Aiguille du Midi. P, protogine; S, crystalline schists; C, contact.

the variation more marked than in those from Wisconsin. Although white is the most common, almost any colour, from pink, purple, or red, to gold, bronze, and black, may be met with; while even a peacock-blue pearl is on record. The golden and wine-coloured specimens are presumably from the beautiful *Unio dromas*, the only common species with a golden or yellow interior to the shell. Pink appears to be the colour most highly esteemed in America, next to which comes red, and then black; but exceptional colours, like sky-blue, command exceptional prices. So far as shape is concerned, the first place is taken by spherical pearls, after which come hemispherical, or bullet-shaped examples, while oval or pear-shaped specimens follow. As regards the maximum prices obtained for American pearls, the statements are somewhat conflicting and indefinite. It seems, however, to be certain that a spherical pink pearl from Tennessee realised 130*l.*, while a sky-blue pearl from Caney Fork, in the same State, was sold in America for 190*l.*, and subsequently in London for 660*l.* With good luck, there is therefore evidently money to be made by pearl-hunting in the American rivers.

R. L.

the Aiguilles Rouges, the latter by one of more varied character, and, generally speaking, of more bedded aspect.

Of these two marginal crystalline zones, the northern is prolonged to the valley of the Rhone, where it crosses just below Martigny, after which it disappears beneath the sedimentaries of the Western Oberland. The southern passes on to join the Pennine chain to the east of Mont Blanc. The crystalline rock, however, which forms this and the rest of the central *massif*, is more or less fusiform in outline. (The term "amygdaloidal" applied by the authors seems misleading, as its connection with this structure is about equal to that of Monmouth and Macedon.) The central part of the *massif*—though according to them not the very highest rocks of Mont Blanc—consists of a granitoid rock called protogine, formerly said to be composed of quartz, felspar, and talc, and to be the most ancient in the region. The talc is only biotite, more or less hydrous, and the rock intrusive

¹ Recherches Géologiques et Pétrographiques sur le Massif du Mont-Blanc. Par Louis Dupaix et Ludovic Mrazec. (Mem. de la Société de Physique et d'Histoire naturelle de Genève.) Tome xxxiii. Pte 1^{re}.